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Week of February 4, 1991

CHANGING STEREOTYPES

Most of our daughters are opting out of careers in math and science. The U.S. Labor Department's Women's Bureau wants them to reconsider.

Several girl friends shared Janet Rutledge's advanced math classes when she was a junior high student in the 1970's, but by high school, they had all dropped out.

"They didn't think they'd get dates if they were too good at math, and all of a sudden they said they weren't interested," says Rutledge, who grew up in Rockville, Md., an affluent suburb of Washington, D.C.

Now a professor of electrical engineering at Northwestern University in Chicago and the owner of her own digital hearing-aid device business, Rutledge, who is black, is often invited to speak to college undergraduates.

"When they hear about all the things I'm doing," she says, "they want to know if I have trouble getting dates."

Rutledge may hear the same question during a conference this month co-sponsored by the Atlanta Women's Bureau at Tuskegee University in Alabama. The conference repeats the theme of other conferences co-sponsored by U.S. Labor Department's Womens Bureau in almost all 10 regions during the past few years: convincing junior high and high school girls from isolated farms in Mississippi and Florida, reservations in the West and urban ghettos in the Northeast that science and math are worth pursuing.

"Most women now, even in 1991, are clustered in traditionally women's occupations," says Rose Kemp, director of the Kansas City Women's Bureau. "There's nothing wrong with these fields except they're low wage, generally. There are increased numbers of women who are taking care of themselves and their families, and they need to be able to compete in the fields that command better wages. The other thing is, math and science are becoming very important in almost every industry."

Important or not, the majority of girls are still opting out of math and science classes just as Rutledge's classmates did almost 15 years ago. In 1986, women comprised only 13 percent of the science and engineering workforce, 13 percent of the physical and environmental scientists, eight percent of chemical engineers and only three percent of mechanical and electrical engineers. ("Science and Engineering Indicators, 1989," National Science Board).

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The social current that gradually carries girls away from math and science classes apparently begins undetected early in their school years.

"Research tells us schools are not equitable environments and that girls and boys receive very different educations sitting in the same classroom," says Janice Koch, assistant professor of science education at Hofstra University in New York. "Girls in kindergarten outscore boys in kindergarten in both math and verbal skills. However, when girls and boys graduate, boys outscore girls in math and verbal skills."

The reason, Koch and other speakers at Women's Bureau conferences agree, is that school tends to emphasize what girls do best -- sitting still, paying attention -- while reinforcing what boys need most.

"Schools are very good in the early grades at remediating the problems boys bring to school -- lack of impulse control, lack of verbal and small muscle development," says Selma Greenberg, professor of elementary education at Hofstra University. "Typically, girls do not play with pre-scientific toys that help boys later on in geometry or physics -- playing with boats, cars, building blocks. Play for girls is very talky, not much doing, and schools haven't seen fit to remedy this."

Another problem evident at every grade is the tendency for "boys to take over and girls to let them take over," says Rebecca Lubetkin, executive director of the Consortium for Educational Equity at Rutgers University and Women's Bureau conference speaker. "Dependency is seen as appealing enough in girls that teachers will often help them set up equipment, whereas the boys are clearly told to go back and read how to do it."

David Pinkerton, a chemistry/physics teacher at Smokey Hill High School in Aurora, Colo., is so attuned to that tendency he routinely assigns all-girl and all-boy lab teams. Pinkerton has been a speaker at conferences co-sponsored by the Denver Women's Bureau.

"I once had a male student come in after the class had been going four or five weeks and had to assign him to a girls' lab team," says Pinkerton. "The girls were setting up the equipment, but the instant he got into the group, they stood back and watched him put it together. It's so subtle I don't think teachers are aware it happens."

It may be that teachers are not only unaware of such tendencies but are themselves part of the problem.

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"Most elementary school teachers are women and they're victims of the same forces," says Florence Falk-Dickler, equal opportunity specialist at the New York Women's Bureau and former elementary school teacher. "It wasn't considered feminine for women to study math and science, so they themselves need encouragement and practical courses in this sort of thing."

"Many adult women who became elementary teachers have bought the myth about innate ability," says Koch. "There are no math and science genes."

It's for that reason that many of the Women's Bureau conferences are held as training sessions for teachers only.

"We give them (the teachers) very concrete examples of ways that will discourage girls," says Falk-Dickler. "Teachers often say they didn't realize they were doing that."

Subtle sex tracking aside, there are other, more obvious forces which discourage boys as well as girls from following math and science career paths.

According to Lubetkin, the typical elementary school student in the U.S. gets fewer than 45 minutes a week of science. Yet, Lubetkin says, "boys and girls start deciding science is for or not for them in fourth grade. By eighth grade, research shows students know if science will be a part of their lives. The pool for scientists is at its largest in the eighth grade. By college, the only movement is out of the pool."

At the Women's Bureau conferences, teachers are shown how to teach cooperative math and science, where students work in teams to solve problems or conduct experiments. "Cooperative learning counts everyone in, and creates less stress," says Falk-Dickler. "Girls and minorities often do not do well in competitive type learning."

Teachers are also introduced to one of education's newest tools: family math/science, in which parents accompany their children back to school in the afternoons or evenings for fun and adventure building spider webs, mixing chemicals or solving fractions with out pencil or paper.

It's a concept meant to address yet another component to the problem: lack of parental support.

"What happens to parents as their children get beyond a certain point is they say math is not necessary or they won't need

it in their lives or they won't be going on to college, so why worry about it," says Lubetkin. "So what parents and children do together in family math is much like going swimming together. The parents then get to understand the breadth of mathematics, and its abstractness becomes beautiful."

For many junior high and high school girls, parental involvement may come for the first time at one of the Women's Bureau conferences. Last November, the Denver Women's Bureau held a conference exclusively for teachers and parents. "In Salt Lake City we found the girls were accepted on the job by employers but were rejected at home because people were so steeped in their religious values," says Oleta Crain, director of the Denver Women's Bureau. "But doing this now for girls in the sixth through 12th grades and getting parents interested I think will help."

At a typical conference held at Mississippi State University in Starkville in April 1990, almost 300 girls were bused to the college campus for a day. In the morning they heard from role models like Janet Rutledge. In the afternoon they chose from a menu of hands-on labs including high voltage, climatology, aerospace, chemical engineering and veterinarian medicine.

"It was absolutely valuable to the girls," says Dorris Muscadin, equal opportunity specialist with the Atlanta Women's Bureau. "At the beginning some of them seemed to wonder what they were doing there. They weren't too enthusiastic. But at the end you could hardly keep them quiet."

It's the goal of Women's Bureau that such sessions will become a turning point in students' lives.

"Everyone knows math and science is hard, so you're only going to take it if you feel there's something for you at the end of the suffering," says Lubetkin. "So this issue of perceived utility is very important. We do that by exposing them to careers, a vast number of careers they never thought were math and science-based."

And as for the stubborn stereotype that smart women aren't feminine?

"I assure them (the students) that's not the case," says Rutledge. "I say the men they want to bothered with are the men who are interested in you because of those things."

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FILLERS FROM THE U.S. LABOR DEPARTMENT

The first strike by federal government workers was in 1835 by navy yard workers in Washington, D.C., according to "Labor Firsts in America," a U.S. Labor Department publication.

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The first sit-down strike was in 1842 by Pittsburgh puddlers and boilermakers, who seized a mill during a strike, according to a U.S. Labor Department publication, "Labor Firsts in America."

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The first strike of national importance occurred in 1877 when railroad workers on several eastern and mid-wester lines struck to protest wage cuts, according to Labor Firsts in America," a U.S. Labor Department publication.

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